

RADIODETECTION®

SPX
TECHNOLOGIES

MRX **G**

RF Marker Locator

Technical specification








MRXG Locator Specification

1. Product Summary

1.1 Product Descriptions	Multi-purpose Precision Locator Cable, Pipe and RF Marker Locator Locate System Receiver Multi-function Precision Locator
1.2 Intended Use	Locating and mapping the position / path of buried cables, pipes and RF Markers Detecting and pinpointing insulation faults on buried cables and pipes Creating survey records of buried cables and pipes locations
1.3 Standard Equipment	Locator with lithium-ion battery pack Charger and mains lead USB lead User guide Rechargeable battery instruction sheet

2. Performance

2.1 Sensitivity	6E-15 Tesla 5 μ A at 1 meter (33kHz)
2.2 Dynamic range	140dB rms/VHz
2.3 Selectivity	120dB/Hz
2.4 Depth measurement precision ¹	<p>Cable/Pipe/Sonde: $\pm 3\%$ RF Markers: $\pm 15\% \pm 5\text{cm}$ – RF Marker Type dependent. Depth precision valid to:</p> <div>  Near Surface: 2' / 60cm  Ball Marker: 4.9' / 1.5m  Mid-Range: 5.9' / 1.8m  Full Range: 7.9' / 2.4m </div> 
2.5 Locate accuracy	$\pm 5\%$ of depth
2.6 Active Locate filter bandwidth	$\pm 3\text{Hz}$, $0 < 1\text{kHz}$ $\pm 10\text{Hz}$, $\geq 1\text{kHz}$
2.7 Start-up time	< 2.5 second
2.8 Maximum depth readout ²	Cable/Pipe: 98' / 30m Sonde: 64' / 19.5m RF Markers: 16' / 5m

3. Locate Functions

3.1 Active Locate Modes	<ul style="list-style-type: none">• Peak• Peak+™ (choice of combined Peak & Guidance or Peak & Null)• Guidance• Broad Peak™• Null• RF Marker• Combined (Cable, Pipe and RF Marker)																																											
3.2 Gain control	Guidance Mode: Automatic Other modes: Manual gain using “+” or “-” with one touch to return to center (50% of Full Scale)																																											
3.3 Active locate frequencies	Up to 5 additional frequencies in the range 50Hz to 1kHz at 1Hz resolution																																											
3.4 Custom locate frequencies	21 Frequencies: ELF (98/128Hz), 512Hz, 570Hz, 577Hz, 640Hz, 760Hz, 870Hz, 920Hz, 940Hz, 1090Hz, 1450Hz, 4096Hz, 8kHz, 8440Hz, 9820Hz, 33kHz, 65kHz, 82kHz, 83kHz, 131kHz and 200kHz* *Use of the 200kHz frequency is subject to radio licensing restrictions for Short Range Devices in the EU and possibly other countries. Users are responsible for complying with local regulations.																																											
3.5 RF Markers	<table><tr><th>Utility</th><th>Display abbreviation</th><th>Color</th><th>Frequency</th></tr><tr><td>French Power</td><td>PFR</td><td>Natural</td><td>40.0 kHz</td></tr><tr><td>General / Non-drinkable water</td><td>PUR</td><td>Purple</td><td>66.35 kHz</td></tr><tr><td>Cable TV</td><td>CTV</td><td>Black / Orange</td><td>77.0 kHz</td></tr><tr><td>Gas</td><td>GAS</td><td>Yellow</td><td>83.0 kHz</td></tr><tr><td>Telephone / Telecoms</td><td>TEL</td><td>Orange</td><td>101.4 kHz</td></tr><tr><td>Sanitary</td><td>SAN</td><td>Green</td><td>121.6 kHz</td></tr><tr><td>German Power</td><td>PDE</td><td>Blue / Red</td><td>134.0 kHz</td></tr><tr><td>Water</td><td>H2O</td><td>Blue</td><td>145.7 kHz</td></tr><tr><td>Electrical Power*</td><td>PWR</td><td>Red</td><td>169.8 kHz</td></tr></table> <p>*Use of the red Electrical Power (PWR) marker locate mode is subject to radio licensing restrictions for Short Range Devices in the EU and possibly other countries. Use of the orange Telephone/Telecoms (TEL) marker locate mode is restricted in Canada. Users are responsible for complying with local regulations.</p>				Utility	Display abbreviation	Color	Frequency	French Power	PFR	Natural	40.0 kHz	General / Non-drinkable water	PUR	Purple	66.35 kHz	Cable TV	CTV	Black / Orange	77.0 kHz	Gas	GAS	Yellow	83.0 kHz	Telephone / Telecoms	TEL	Orange	101.4 kHz	Sanitary	SAN	Green	121.6 kHz	German Power	PDE	Blue / Red	134.0 kHz	Water	H2O	Blue	145.7 kHz	Electrical Power*	PWR	Red	169.8 kHz
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3.6 Sonde Frequencies	4 Frequencies: 512Hz, 640Hz, 8kHz and 33kHz																																											
3.7 Fault Find	8KFF and CDFF Locate insulation sheath faults on pipes and cables using the accessory A-Frame and a compatible transmitter																																											
3.8 Passive Locate Modes	<ul style="list-style-type: none">• Power• Radio• CPS – cathodic protection system• CATV – Cable TV• Passive Avoidance – simultaneous locate of power and radio																																											
3.9 Power Filters™ function	Switch out of sensitive Power Mode to locate on any of 5 individual mains harmonic frequencies:																																											
	HARMONIC	50 Hz regions	60 Hz regions																																									
	Primary	50 Hz	60 Hz																																									
	3rd	150 Hz	180 Hz																																									
	5th	250 Hz	300 Hz																																									
	7th	350 Hz	420 Hz																																									
	9th	450 Hz	540 Hz																																									

3.10 Information displayed	<ul style="list-style-type: none"> • Signal strength - moving bar graph and numeric value • Mode indication (Peak, Null, Guidance, Peak+ with option of Guidance arrows or Null arrows) • Line or Sonde locate type • Proportional left/right indication • Compass: full 360° line direction indicator • Accessories in use indication • Accessory specific custom screen • Depth and current readout (Line location) • Depth readout (Sonde location) • Gain level (in dB) • Frequency selected • Marker type selected • Battery condition • Speaker volume • Operating frequency • Bluetooth® status • GPS satellites in view • GPS status • Configuration menu and submenus • Software version • Last calibration date • Survey measurement counter • Current Direction mode indicator • Current Direction arrows • Fault Find mode indicator • Transmitter communication status • Transmitter standby status • StrikeAlert™ warning • Overload warning • Swing warning
3.11 Audio output tones	<p>Volume level: Vol0, Vol1, Vol2, Vol3, Vol4 and Vol5</p> <p>Audio Level Pitch: Low and High</p> <p>Audio feedback for menu navigation</p> <p>StrikeAlert audio warning</p> <p>Swing audio warning</p> <p>Power / Passive Avoidance / Radio modes: Real Sound derived from detected electromagnetic signal</p> <p>Peak / Peak+ modes and CPS / CATV modes: Synthesized audio tone proportional to signal strength</p> <p>Guidance mode: Continuous tone when locator is to the left of target, intermittent tone when to the right of target</p> <p>Null mode: Synthesized Audio tone proportional to signal strength. Low pitch to left of target, high pitch to right of target</p>
3.12 Accessory locate functions	<p>Locator clamps: Used to identify individual target cable(s) in a bundle or cabinet using signal strength read-out</p> <p>Stethoscopes: Used to identify individual target cable(s) in a bundle or confined space such as a cabinet using signal strength read-out</p> <p>CD / CM clamp: Used to measure locate current and to confirm target cable using Current Direction</p>

4. Locate Function Enhancements

4.1 StrikeAlert™	Audio and visual warning when a cable or pipe less than 12" / 30cm deep is detected. Operates in Active and Passive locating modes
4.2 Haptic Vibration	Handle vibrates when StrikeAlert, Swing and Overload warnings activated
4.3 Swing Warning	Audio and visual warning when the user is swinging the locator excessively
4.4 Dynamic Overload Protection™	40dB, automatic <ul style="list-style-type: none"> Automatically manages the system gain to compensate for strong signals e.g. from mains power or substations, to enable accurate locating
4.5 Overload warning	If the MRX G becomes overloaded, users will be alerted by a flashing mode icon. Both the depth and current measurements will be disabled in the event of an overload.
4.6 Current Direction™ (CD)	<ul style="list-style-type: none"> Measures the direction of current flowing in buried pipes or cables to ensure that an operator is able to identify and follow the target utility Provides operator with arrows indicating the direction of current flowing in the located pipe or cable to confirm that they are following the target utility
4.7 iLOC™	Metric: Remote transmitter control from up to 450m away ³ US Customary: Remote transmitter control from up to 1400' away ³ Control transmitter frequency, power level and SideStep
4.8 SideStep™	Enables locating where other signals are interfering, and without compromising the optimum locate frequency Remotely shifts the locate and transmitter frequency by several Hz, out of the bandwidth of other locate signals that may be interfering with the locate
4.9 Simultaneous depth and current readout	Both utility depth and locate signal current are displayed simultaneously, giving the operator more information to help them to follow the target utility
4.10 Survey Measurements	Store up to 1,000 survey points within the locator, and append GPS data from external GNSS sources over Bluetooth Export data immediately or as a batch over Bluetooth
4.11 Fault Find	Apply a Fault Find signal with a Tx-5 and Tx-10 transmitter, then use an accessory A-Frame to detect and pinpoint insulation faults Fault find accuracy: Metric: 10cm US Customary: 4"
4.12 4kHz locate frequency and 4kHz CD	Designed for tracing higher impedance lines such as twisted pair telecoms or street lighting over distance Combine with Current Direction to help trace the target utility through dense or complex infrastructure
4.13 Peak+ mode	Use the accurate Peak bargraph, and add either proportional Guidance arrows for faster locating, or Null arrows to check for the presence of distortion
4.14 Integrated GPS option	Faster surveying using integrated GPS – no need for a separate hand-held device

5. Configurability

5.1 Phone operating system	Android iOS
5.2 Option selection	All options can be enabled or disabled on the locator or using the RD Manager Online PC software
5.3 Languages supported	Fourteen: English, French, German, Dutch, Polish, Czech, Slovakian, Spanish, Portuguese, Swedish, Italian, Turkish, Russian, Hungarian
5.4 Mains power network options	50 Hz or 60 Hz
5.5 Mode selection	All locate modes can be individually enabled or disabled
5.6 Active RF Marker selection	All RF Markers can be individually enabled or disabled
5.7 Active frequency selection	All active frequencies available can be individually enabled or disabled
5.8 Passive mode selection	All passive modes can be individually enabled or disabled
5.9 StrikeAlert	Enable / disable
5.10 Swing warning	Enable / disable
5.11 Haptic vibration	Enable / disable

5.12 Peak+ arrow selection	Guidance arrows or Null arrows Selected using the locator menu or with a long press of the antenna key
5.13 GNSS ('GPS') settings	Internal / External (connect over Bluetooth) / Off / Reset
5.14 iLOC Connectivity	On/Off
5.15 Data export protocols supported	PPP / choice of 3 ASCII formats. Optionally append positional data
5.16 Time/date setting	Correct or update locator real-time clock using the RD Manager Online PC software or GNSS signals
5.17 CD Reset	Reset CD phase analysis with a single long press of the frequency key
5.18 Audio	Set audio tone frequency level high or low

6. Connectivity

6.1 Wireless connections	2 x Bluetooth 2.0 – SPP profile, class 1 2 x Bluetooth Low Energy 5.0
6.2 iLOC remote transmitter control range ³	Metric: Up to 450m US Customary: Up to 1400'
6.3 iLOC remote transmitter control functions	Set transmitter frequency Set transmitter power output level Transmitter standby SideStep
6.4 Wired connections	Type C USB (cable included as standard): Connect to a PC to configure and update locator and to retrieve Survey Measurement and usage log data 3.5mm Stereo jack: Connect wired headphones Accessory port: Connect Radiodetection accessories

7. Data capabilities and GNSS ('GPS')

7.1 On-board GNSS ('GPS') option	GNSS data automatically added to Survey Measurements every time locate data is saved, and every second on usage-logging data Accurate to 2.5m CEP with SBAS enhancement available Supports GPS and GLONASS satellites constellations SBAS – Augmentation systems (where available) <ul style="list-style-type: none"> • WAAS – North America • EGNOS – Europe • MSAS – Japan • GAGAN – India
7.2 Link to external GNSS ('GPS')	Over Bluetooth <ul style="list-style-type: none"> • Connect to an external GNSS enabled device to combine survey measurements with that device's GNSS data on the external device
7.3 External GNSS position read-in to locator memory	<ul style="list-style-type: none"> • Connect to an external GNSS device to read positional positioning from that device and combine with the locator's survey measurement data on board the locator⁴
7.4 Usage-logging memory	4 Gb
7.5 Usage-logging capacity	Over 500 days, measured at 8 hours use per day
7.6 Usage-logging capture rate	1/second

7.7 Usage parameters logged	Serial number Log reference and id Operating mode Locate frequency Sonde /line Signal strength Gain setting Depth Current Accessory in use Antenna mode Arrows readout Compass angle CD phase Overload status Dynamic Overload Protection Status	Keys pressed Audio status Volume Menu in use Battery status User warnings status StrikeAlert status Bluetooth status Fault find arrow Sidestep status Language Depth units Power setting Compass setting CD reset status Swing angles Utility Date and time	With a GNSS fix: Latitude Longitude Altitude GNSS mode GNSS date and time Horizontal Dilution Geoid DGPS Time and ID Geoid Units GNSS fix Number of satellites Altitude units Time reference
7.8 Survey measurement capacity	Up to 1,000 data records		
7.9 Survey measurement data captured	Standard data: Log # Survey Reference Antenna Mode Depth Current (mA) Frequency in use (Hz) Sonde / Line Signal Strength (dBµV and %) Signal Strength (%) Gain Setting (dB) Compass (deg) Arrow readout CD Phase (deg) Accessory Type Battery level Volume Overload Flag Date and Time Marker Type Marker Depth Marker Gain (dB) Marker Signal Strength (%)	With Internal or External GNSS Fix: GPS Mode GPS Date and Time GPS Distance (m) Latitude Angle (deg) Latitude Direction Longitude Angle (deg) Longitude Direction GPS Fix Satellites in use Horizontal Dilution Altitude Value (m) Altitude Units Geoid Value (m) and Units DGPS Time DGPS ID Time Reference GPS Mode GPS Date and Time GPS Distance (m) Latitude Angle (deg)	
7.10 Survey measurement export options	RD Manager Online via USB Bluetooth – ‘live’ per measurement Bluetooth – batch export		
7.11 Bluetooth survey measurement data protocol options	PPP ASCII (choice of 3 formats) Optional GPS data appended		

8. Power options

8.1 Rechargeable	Custom Lithium-Ion (Li-Ion) battery pack
8.2 Battery run-time (continuous) ⁵	Li-Ion pack: 15 hours (50% duty cycle)* *Based on highest power marker, all features on. Battery run time will vary based on use of power marker, Bluetooth, backlight strength, GNSS and other features.
8.3 Charging options (Li-Ion pack)	Mains charger: 100-250 Volts AC, 50/60 Hz Automotive charger: 12-24V DC
8.4 Charging time (Li-Ion pack)	3 hours to 80% from empty with maintenance trickle charging thereafter
8.5 Charging temperature	Metric: 0°C to 45°C US Customary: 32°F to 113°F

9. Physical Characteristics

9.1 Design	Ergonomic, balanced and lightweight design for comfortable use during extended surveys
9.2 Construction	Injection Molded ABS Plastic
9.3 Weight	With Lithium-Ion battery pack fitted: Metric: 2.0kg US Customary: 4.41lb
9.4 Ingress Protection rating	IP65* Protected against dust ingress and jets of water ⁶ applied from any direction *The antenna loop is IP55 rated. Minimal dust ingress can occur, this does not affect performance
9.5 Display type	High contrast custom made monochrome LCD
9.6 Audio options	Built-in waterproofed speaker 3.5mm headphone socket
9.7 Operating temperature ⁷	Metric: -10°C to 50°C US Customary: 14°F to 122°F
9.8 Storage temperature	Metric: -20°C to 50°C US Customary: -4°F to 122°F
9.9 Unit dimensions	Metric: 648mm × 350mm × 177mm US Customary: 25.5" × 13.8" × 6.9"
9.10 Shipping dimensions	Metric: 700mm × 260mm × 330mm US Customary: 27.6" × 10.9" × 15.6"
9.11 Shipping weight (kit)	Includes: <ul style="list-style-type: none"> • MRXG with lithium-ion battery • Mains charger + lead • MRXG Bag • User guide • MRXG box Metric: 2.6kg US Customary: 5.7lb

10. RD Manager Online Supporting PC Software

10.1 Operating System Compatibility	Microsoft® Windows® 10 onwards – 64-bit versions
10.2 Locator system compatibility	Radiodetection RD7200, RD8200, RD8200 SG, MRX, MRX G and MRX SG Precision Locators
10.3 Functions	<ul style="list-style-type: none">• Locator configuration• eCert® remote calibration certification• Factory calibration certificate retrieval• User account management• CALSafe™ maintenance schedule enforcement• Locator software update• Survey Measurement retrieval• Product registration for extended warranty
10.4 Data export formats	.csv for database and spreadsheet applications .xls / .xlsx for Microsoft® Excel®

11. Warranty and Maintenance

11.1 Manufacturer's warranty duration	3 years standard, on registration
11.2 Recommended calibration and maintenance schedule	Annual, or at the beginning / end of a lease period if earlier
11.3 eCert remote calibration	<ul style="list-style-type: none">• Remote calibration certification using an internet connection to Radiodetection• Recommended schedule: annual, or at the beginning / end of a lease period
11.4 CALSafe®	<ul style="list-style-type: none">• Can be enabled to prevent the locator operating when beyond a defined calibration / maintenance schedule• Disabled by default• 30-day countdown to calibration due date
11.5 Enhanced Self-Test	On-unit Applies test signals to locate circuitry to confirm correct operation, as well as the typical tests for screen and DSP functions. Recommended schedule: weekly, or before each use.
11.6 Storage recommendation	Store in a clean and dry environment. Ensure all terminals and connection sockets are clean, free of debris and corrosion and are undamaged
11.7 Cleaning	Clean with a soft, moistened cloth. Do not use <ul style="list-style-type: none">• Abrasive materials or chemicals• High pressure jets of water If using this equipment in foul water systems or other areas where biological hazards may be present, use an appropriate disinfectant.

12. Certification and Compliance

12.1 Standards	
<i>CE Safety:</i>	EN 61010-1:2010 / A1:2019
<i>CE EMC:</i>	EN 61326-1:2021
<i>CE Radio:</i>	EN 301 489-3 V2.3.2 EN 301 489-17 V3.2.4 EN 301 489-19: V2.1.1 EN 300 330 V2.1.1 EN 300 328 V2.2.2 EN 303 413: V1.2.1
<i>CE SAR:</i>	EN 50566 EN 62479 IEC 62209-1528:2020
<i>ENV (Environmental):</i>	EN 60529 1992 A2 2013 EN 60068-2-64:2008 Test Fh ESTI EN 300 019-2-2:1999 (per table 6) EN 60068-2-27:2009 (Test Ea) EN 300 019-2-2:1999 (per table 6)
12.2 European directives	Radio Equipment Directive – 2014/53/EU Low Voltage Directive – 2014/35/EU EMC Directive – 2014/30/EU RoHS Directive – 2011/65/EU Battery Regulation – (EU) 2023/1542 Declaration of conformity is available from www.radiodetection.com
12.3 Radio FCC, IC	
<i>FCC EMC:</i>	47CFR 15.107 47CFR 15.109 ICES-003 Issue 7, January 2020
<i>FCC RF:</i>	47CFR 15.207 47CFR 15.209 RFC 15.247
<i>FCC SAR:</i>	FCC 47 CFR part 2 (2.1093)
<i>ISED SAR:</i>	RSS-102 Issue 5, March 2015
12.4 Environmental	WEEE compliant ROHS compliant Altitude: up to 5000m Outdoor use Wet location
12.5 Manufacturing	ISO 9001: 2015

All specification are measured in test conditions, at 21°C / 70°F.

¹ Based on volumetric testing at a known fixed depth. True depth accuracy depends on factors such as ground composition, utility characteristics and the locate frequency / signal strength employed. Always follow local safe digging guidelines.

² The MRXG will locate to greater depths in the right conditions, but depth accuracy will be compromised. Depth measurement will not be displayed beyond these depths.

³ Tested with clear line-of-sight. Range is dependent on electrical environment and weather conditions. For optimum range, face the locator toward the transmitter and raise the transmitter 2' / 60cm from the ground.

⁴ RD Map+ required with premium subscription.

⁵ Water projected by a nozzle at a pressure of 30kPa / 0.3 bar / 4.4 psi in accordance with BS EN 60529 1992 A2 2013.

⁶ At very low temperatures, battery life will be degraded and measurement precision may reduce.

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To be the world's leader in the management of critical infrastructure and utilities.

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